AUTOMATIC CUTTING DEVICE PUT ON A FLOOR AND A SUPPORT DEVICE FOR AUTOMATIC CUTTING DEVICE PUT ON A FLOOR

FIELD OF THE INVENTION

The present invention relates to an automatic cutting device, including a radial arm saw device, which is placed on a floor, and a support device for the automatic cutting device which is placed on a floor.

BACKGROUND OF THE INVENTION

The conventional radial arm saw device, which is placed on a floor, is positioned with the workpiece to be cut on the base horizontally, the cutting operation then being carried out.

In this way, there is no problem in carrying out the cutting operation when the workpiece to be cut is shortened. However, it is too hard to prepare to position the workpiece to be cut on the base horizontally by one person when the workpiece to be cut is long and heavy, comparatively. Then, the cutting operation has to be carried out by more than two people. In addition, the conventional

device cannot cut the workpiece to be cut vertically if it cannot support the workpiece to be cut, well.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an automatic cutting device which is placed on a floor, and a support device for the automatic cutting device which is placed on a floor which can be carried out easily by oneself in a condition that the workpiece to be cut is attached firmly to the base without reference to the length and weight of the workpiece to be cut.

The present invention is understood to encompass embodiments which include all, or only a portion of, the above objects, features and advantages which, unless recited in claims defining the invention, are understood not to limit interpretation of such claims. The above, and other objects, features and advantages of the present invention will become apparent from the following description read in conjunction with the accompanying drawings, in which like reference numerals designate the same elements.

It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only, and are not intended as a definition of

the limits of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view showing a first embodiment of the present invention;

Fig. 2 is a side view showing a first embodiment of the present invention;

Fig. 3 is a plane view showing a first embodiment of the present invention;

Fig. 4 is an explanation view of a base showing a first embodiment of the present invention;

Fig. 5 is an explanation view of a sloping means showing a first embodiment of the present invention;

Fig. 6 is an explanation view showing the way in which a workpiece to be cut is attached fixedly by sandwiching in a first embodiment of the present invention;

Fig. 7 is an explanation view when in use, showing a first embodiment of the present invention;

Fig. 8 is an explanation view showing the way in which cutting is performed with an incline in a first embodiment of the present invention;

Fig. 9 is a plane view showing a second embodiment of the present invention;

Fig. 10 is a cross sectional view taken along the line 10-10 in Fig. 9;

Fig. 11 is a front view showing a third embodiment of the present invention;

Fig. 12 is a side view showing a third embodiment of the present invention;

Fig. 13 is an explanation view when in use showing a third embodiment of the present invention;

Fig. 14 is a front view showing a fourth embodiment of the present invention;

Fig. 15 is a bottom view showing a fourth embodiment of the present invention;

Fig. 16 is an explanation view of a sloping means showing a fourth embodiment of the present invention;

Fig. 17 is an explanation view when in use showing a fourth embodiment of the present invention;

Fig. 18 is a front view showing a fifth embodiment of the present invention;

Fig. 19 is a side view showing a fifth embodiment of the present invention;

Fig. 20 is an explanation view when in use showing a fifth embodiment of the present invention;

Fig. 21 is a front view showing a sixth embodiment of the present invention;

Fig. 22 is a side view showing a sixth embodiment of the present invention;

Fig. 23 is an explanation view when in use showing a sixth embodiment of the present invention;

Fig. 24 is a front view showing a seventh embodiment of the present invention;

Fig. 25 is a side view showing a seventh embodiment of the present invention; and

Fig. 26 is an explanation view when in use showing a seventh embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention are described in more detail below, referring to the accompanying drawings.

An understanding of the present invention may be best gained by reference Figs. 1 to 8. Reference numeral 1 is an automatic cutting device which is placed on a floor. The automatic cutting device 1 is comprised of a base 7 further including a base body 3 forming a concave part 2 at a center portion in an upper portion thereof, a rotatable base 5 having an upper surface which is supported pivotably and rotatably at near 90 degrees by a pivot pin 4 at the concave part 2 of the base body 3, positioning the upper surface thereof horizontally to the upper surface of the base body 3, and an operation lever 6 which is projected from the rotatable base 5 in an anterior direction, capable of rotating the rotatable base 5 at 45 degrees in a transverse direction. The automatic cutting device 1 further comprises a supporting member 10 for a cutting blade, attaching rotatably to a supporting arm 8, capable of making a cutting blade 9, which is formed in the shape of a disc saw, to position at a center portion of the rotation of the rotatable base 5. The supporting arm 8 is attached fixedly to rear portion of the rotatable base 5 of the base 7 so as to project upward.

A cutting device 13 including a motor 11 is attached to the supporting member 10 for the cutting blade 9 as the disc saw attached to a drive shaft of the motor 11, and a spring 14 serves to bias the supporting member 10 for the cutting blade upwardly every time. The cutting device 13 also comprises a handle 16

which is formed at a case 15 of the motor 11, and a cover 17 which covers a part except for the under side of the cutting blade 9.

The automatic cutting device 1 further includes a holding device 22 including a fixable holding piece 19 having a workpiece to be cut 18 which is fixed on the base body 3, the workpiece to be cut 18 being fixed at right angles to the cutting direction of the cutting blade 9 and a movable holding piece 21 capable of sliding on the base body 3 so as to attach fixedly by sandwiching the fixable holding piece 19, and the workpiece to be cut 18, having a lock mechanism 20 which can fix at an optional position. Means for sloping the base 7 are provided (as sloping means 23), corresponding to the slope of the workpiece to be cut 18, which is attached fixedly by sandwiching the fixable holding piece 19 and movable holding piece 21 of the base 7.

The sloping means 23 further includes a shaft 24 provided at the cutting part of the cutting blade 9 of the base body 3 of the base 7 at a part as a shaft core, so as to project both ends outwards. A supporting frame 26 is formed with shaft holes 25, 25, into which are inserted the both ends of the shaft 24, capable of making the right and left sides of the base 7 rotate in a horizontal direction. A base-locking device 30, including a guide hole 27 for a locking pin 29, is formed at a part adjacent the end portion of the supporting frame 26, capable of locking so as to keep the horizontal state of the base 7, and an insertion hole 28 for the

locking pin 29, is formed at the base body 3 and is associated with the guide hole 27 at a generally horizontal state. The locking pin 29 is inserted in the guide hole 27 and insertion hole 28, and locked.

For the automatic cutting device 1 which is described, when the lengthy workpiece to be cut 18 is cut, the base-locking device 30 is released, and the workpiece to be cut 18 is positioned between the fixable holding piece 19 of the base 7 and movable holding piece 21 of the holding device 22. Then, the workpiece to be cut 18 is pushed to the fixable holding piece 19 by the movable holding piece 21 and is attached fixedly, by sandwiching by the locking mechanism 20.

Then, one end part of the lengthy workpiece to be cut 18 is positioned on the floor surface and becomes the slope surface. However, since the base 7 has the same incline to the incline of the workpiece to be cut 18 with a focus on the shaft 24 of the sloping means 23 by its weight of the workpiece to be cut 18 or pressing the workpiece to be cut 18 so as to contact the base body 3, the workpiece to be cut 18 can be fixed to the holding device 22 with ease of operation.

After that, the motor 11 of the cutting device 13 drives the cutting blade 9 to rotate. Also, the cutting blade supporting member 10 is made to move downward against the power of the spring 14 by the handle 16, and the workpiece to be cut 18 is cut by the cutting blade 9.

The supporting member 10 attached the cutting blade 9 is provided to the rotatable base 5, which is attached rotatably to the base body 3, so that it can cut at a vertical state even though the base body 3 is positioned at a slpoed state which corresponds the incline of the workpiece to be cut 18.

In addition, the workpiece to be cut 18 is cut by rotating the rotatable base 5 in the right and left directions so it can cut with the predetermined incline at a vertical state in the length direction of the workpiece to be cut 18.

Other embodiments of the present invention will now be described referring to Figs. 9 to 26. Through the drawings of the embodiments, like components are denoted by like numerals as of the first embodiment and will not be further explained in great detail.

A second embodiment of the present invention is shown in Figs. 9 and 10, and is distinguished from the first embodiment by the fact that the base 7 is replaced with another base 7A, without the rotatable base. An automatic cutting device 1A with the base 7A, while unable to cut a sloped surface, according to the second embodiment, has similar advantages to that according to the first embodiment.

A third embodiment of the present invention is shown in Figs. 11 to 13, and is distinguished from the first embodiment by the fact that the sloping means 23 is replaced with another sloping means 23A, which further includes a

supporting leg 32 provided to a center part at both sides of the base 7, rotating in the right and left directions by pivot pins 31, 31, formed in the shape of a C-letter, and having a flat surface at a bottom surface thereof, and a concave part 33 of the bottom of the base 7 into which the supporting leg 32 is received when not used. An automatic cutting device 1B with the sloping means 23A according to the third embodiment has similar advantages to that according to the first embodiment.

A fourth embodiment of the present invention is shown in Figs. 14 to 17 and is distinguished from the second embodiment by the fact that the sloping means 23 is replaced with another sloping means 23B. The sloping means 23B includes a screw rod 35 attached to the center portion of the bottom surface of the base 7A so as to rotate by rotation of the handle 34. Two operation rods 36, 36 threadably mounted on the screw rod 35, which is disposed at the anteroposterior part, moving in an anteroposterior direction which blocks the rotation at the bottom surface of the base 7A. Supporting legs 39, 39 are supported pivotably at the bottom surface of the base 7A through mounting brackets 37, 37, having an upper part thereof being engaged with the operation rods 36, 36 a lower part thereof projecting downward compared to the bottom surface of the base 7A. An automatic cutting device 1C with the sloping means 23B according to the fourth embodiment has similar advantages to that according to the second embodiment.

A fifth embodiment of the present invention is shown in Figs. 18 to 20 and is distinguished from the second embodiment by the fact that the sloping means 23 is replaced with another sloping means 23C, that further includes a supporting plate 42 having supporting pieces 40, 40 which project upward from one end thereof, supported pivotably by pivot pins 41, 41 at one end of the base 7A so as to rotate the right and left sides of the base 7A in the vertical direction. A height adjustment mechanism 43, having a hand-operated jack, capable of setting the slope of the base 7A to a part between the base 7A and supporting plate 42 positioned at a side of the anti-pivot pins 41, 41 of the supporting plate 42 is provided. An automatic cutting device 1D with the sloping means 23C according to the fifth embodiment has similar advantages to that according to the second embodiment.

In addition, the hand-operated jack, as the height adjustment mechanism 43, is used and explained in this embodiment. In addition, it can be used any kind of mechanisms, which can adjust the height, such as cams, slider moving on the slope and the like.

A sixth embodiment of the present invention is shown in Figs. 21 to 23, and is distinguished from the fifth embodiment by the fact that a support device 45 for the automatic cutting device is used, capable of supporting the conventional automatic cutting device X at the supporting pieces 40, 40 of the supporting plate

42. The support device 45 for the automatic cutting device, supporting the automatic cutting device X according to the sixth embodiment has similar advantages.

A seventh embodiment of the present invention is shown in Figs. 24 to 26, and is distinguished from the sixth embodiment by the fact that the sloping means 23C is replaced with another sloping means 23D which further includes the supporting leg 32 provided at the center part of the support device 44, capable of rotating the right and left sides of the support device 44 in the vertical direction. A support device 45A for the automatic cutting device with the sloping means 23D according to the seventh embodiment has similar advantages to that according to the sixth embodiment.

In addition, the sloping means in the embodiments of the present invention is the device to rotate the right and left sides of the base in the vertical direction, and sloping means having the mechanism to rotate the right and left sides of the base in the vertical direction may be used.

Furthermore, the mechanism which can fix the leg member of the base on the floor on the condition that the base is inclined may be used.

Additionally, for each embodiment of the present invention, the holding device which fixes the workpiece to be cut is attached to the base, and the

automatic cutting device, without the holding device, may be used on the condition that the device cuts the short and light workpiece to be cut, especially.

The present invention is utilized in the industry to manufacture the automatic cutting device which is put on a floor and a support device for the automatic cutting device which is put on a floor.

As set forth above, the advantages of the invention are as follows:

(1) The automatic cutting device which is put on a floor includes a base which can support a workpiece to be cut; a supporting member for a cutting blade, attaching a back end portion thereof to a part adjacent one end portion of a center part of the base, capable of rotating a tip portion thereof in a vertical direction; a cutting device, rotatably drivable by a motor provided at a vertical rotatable part of the supporting member, capable of cutting the workpiece to be cut supported by the base by the cutting blade; and the sloping means which can incline the base corresponding to a slope of the workpiece to be cut supported by the base. Therefore, the slope of the base can corresponds to the slope of the workpiece to be cut by positioning the workpiece to be cut to the base without the length and weight of the workpiece to be cut.

Accordingly, only one person can put the workpiece to be cut on the base at a closely contact and can operate to cut the workpiece to be cut in the vertical direction correctly.

(2) As discussed above, since all one needs to do is provide the sloping means, it is easy to manufacture.

(3) As discussed above, even though the workpiece to be cut is long and has heavy weight, the workpiece to be cut can be attached firmly to the base simply by placing the workpiece to be cut on the base at a positioned state.

Accordingly, the cutting operation can be carried out by oneself.